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Author Affiliation:

Centre for Botanical Research, Department of Botany, The Madura College, Madurai – 625 011, Tamil Nadu, India

Corresponding author:

Centre for Botanical Research, Department of Botany, The Madura College, Madurai – 625 011, Tamil Nadu, India
Email: ksamytaxonomy@gmail.com

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A new species of *Impatiens* (Balsaminaceae) from the Eastern Ghats of Tamil Nadu, India

Karuppusamy S✉, Ravichandran V, Uday Kumar M

ABSTRACT

Impatiens vaiyapurii is described as a new species from the Kolli hills of Eastern Ghats in Tamil Nadu, India. The species shares several morphological characters with *I. dasysperma* Wight, which is endemic to the southern Western Ghats. The photographs, illustrations and conservation status of the species are provided here for easy identification.

Key words: Balsaminaceae, Eastern Ghats, *Impatiens flaccida*, India, Kolli Hills, new species

1. INTRODUCTION

The Genus *Impatiens* L. (Balsaminaceae) is a large genus with 1047 species (POWO, 2020) mainly distributed in South-East Asia and south-western China, eastern to central Himalayas, Western Ghats, Tropical Africa and Madagascar. A few species occur in temperate Eurasia and North America (Grey-Wilson, 1980; Stevens, 2001; Mabberley, 2008; Singh, 2016; Mani *et al.*, 2018; Karuppusamy and Ravichandran 2019). *Impatiens* occurs for the most part in montane forests of the tropics and subtropics of the Old World with five diversity centres, namely Tropical Africa, Madagascar, Western Ghats and Sri Lanka, Sino-Himalaya and South-East Asia (Grey-Wilson, 1980; Mani *et al.*, 2018). In India the genus *Impatiens* is mostly dispersed in the Western Ghats and the Eastern Himalayas (Hooker 1908; Gamble 1915; Vivekananthan *et al.*, 1997; Bhaskar, 2012; Joe *et al.*, 2017). Generally the Eastern Ghats of India not known for the diversity of the genus *Impatiens* only a small number of widespread species were reported (Matthew, 1983; Pullaiah and Rao, 2001). Recently Bhaskar (2012) described two endemic species from the Eastern Ghats viz., *Impatiens shevaroyensis* and *I. yercaudensis*.

During the botanical explorations of Kolli hills of Eastern Ghats, Namakkal district of Tamil Nadu, the authors collected white flowered balsam from the mixed deciduous forests. After a critical examination and perusal of relevant literature (Hooker, 1908; Gamble, 1915; Chandrabose, 1979; Bhaskar, 1981; 2006; 2012; Bhaskar and Razi, 1982; Matthew, 1983; Chandrabose, *et al.* 1984; Jyosna and Janarthanam, 2011; Narayanan *et al.*, 2011; 2012a; 2012b; 2013; Hareesh *et al.*, 2015; Prabhukumar *et al.*, 2015a; 2015b; 2016; 2017; Ramasubbu

et al., 2015a; 2015b; 2017; Chhabra *et al.*, 2016; Mani *et al.*, 2018; Karuppusamy and Ravichandran, 2019) and consulting the type and relevant specimens at different herbaria, namely CAL, E, K, M, MH, and RHT it was revealed that this species is not similar with any described species but Matthew (1983) identified the same species as *I. flaccida* Arn. and reported in Kolli Hills of Namakkal district and Shevaroy hills of Salem district in his flora of the Tamilnadu Carnatic. Later Bhaskar (2012) stated that he has not come across any specimen in wild in South India appearing like *I. flaccida* Arn. This is originally reported from Sri Lanka (then Ceylon). Further we have studied with the Protologue of *I. flaccida* Arn. (Walker, 1836) and type specimen housed at E (https://data.rbge.org.uk/search/herbarium/?specimen_num=312225&cfg=zoom.cfg&filename=E00301357.zip) reveals that it is not matching with the *I. flaccida* and it is more allied to the South Indian species *I. dasysperma*. Therefore, it is described here as a new species along with photographs and Illustrations.

2. TAXONOMIC TREATMENT

Impatiens vaiyapurii Karupp. & V. Ravich. *sp. nov.* *Impatiens flaccida* Arn. Ssensu Mathew in Flora of Tamil Nadu Carnatic. 1.196.1983. Figs. 1 & 2

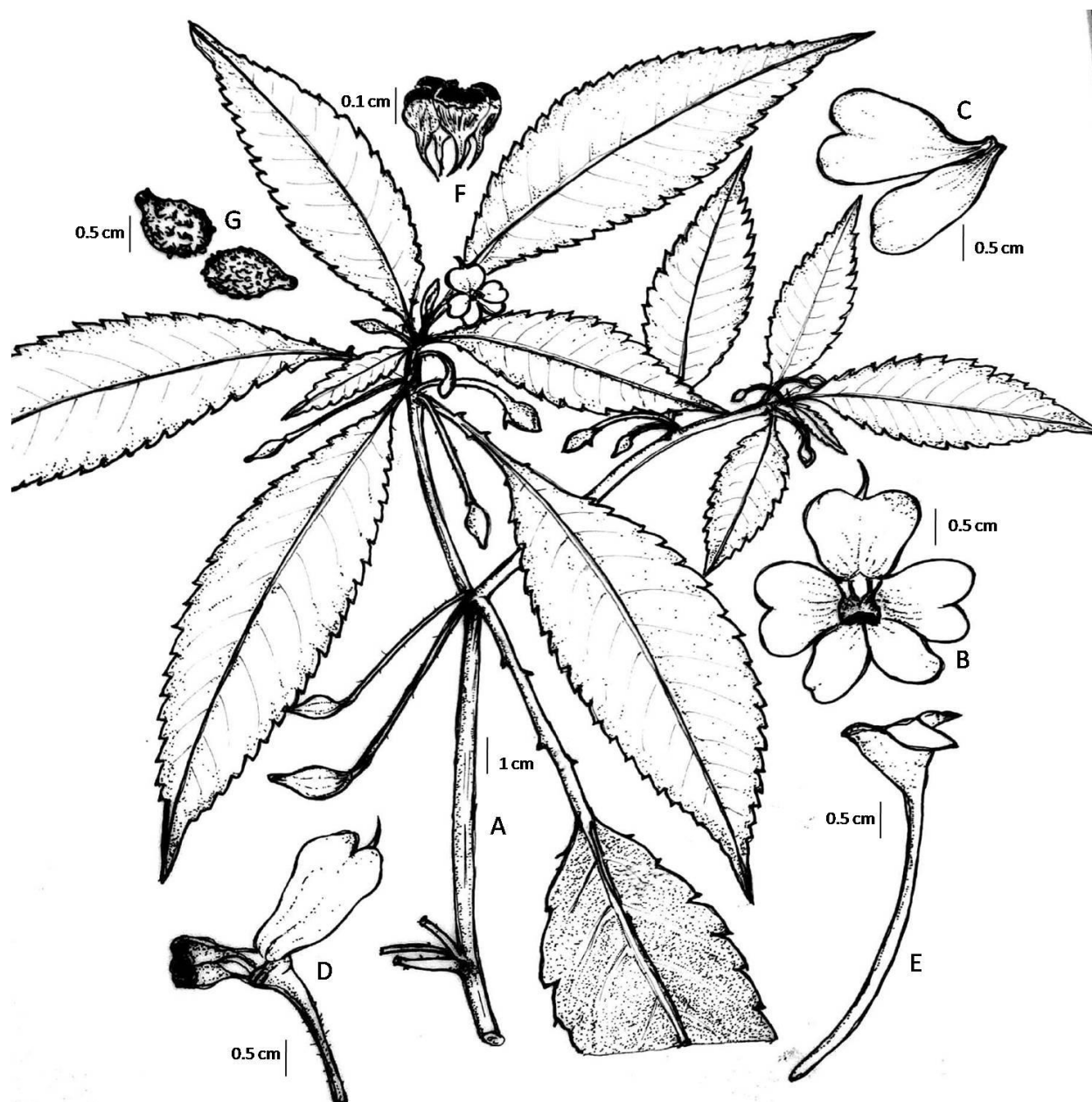


Fig. 1. *Impatiens vaiyapurii* sp. nov.. A: Flowering branch. B: Flower front view. C: Lateral petal. D: Dorsal petal with ovary E: Spur. F: Anther. G: Seeds. – Drawn by S. Karuppusamy



Fig. 2. A-H. *Impatiens vaiyapurii* sp. nov.. A: Flowering branch. B: Flower front view C: Flower lateral view. D: Lateral petals. E: Pedicel with Ovary. F: Dorsal petal with spur. G: Capsule. H: Seeds. I-N. *I. dasysperma*. I: Flowering branch. J-K: Flower. L: Capsule. M: Anther. N: Seeds. – Photos. S. Karuppusamy

Impatiens vaiyapurii is morphologically similar to *I. dasysperma*, which is endemic to the Western Ghats. But it differs by its habitat of deciduous forests below 1000 m, leaves linear-elliptic, crowded on the tip of stem, petiole to 2–5 cm long, flowers white 3–3.5 cm across, dorsal petal broadly obcordate, cuneate at base, slightly divided, apical projection up to 1 cm long; lateral petals slightly lobed, notch without apical projection, lower petals obovate, cuneate at base, not divided at apex, without apical projection, spur to 5 cm long, glabrous, tip curved backward, pedicel up to 6 cm long, glabrous, capsule ovate, finely tomentose; seeds up to 20 per capsule, pale brownish with dome-like hair throughout (Table 1).

Table 1. Diagnostic characters of *Impatiens vaiyapurii* with allied species.

Characters	<i>I. vaiyapurii</i>	<i>I. dasysperma</i>
Habitat	Grown below 1000 m alt. Deciduous forests	Grown above 1000 m alt. semi evergreen to evergreen forests
Leaves	Crowded on the tip of stem, Linear-elliptic	Along the stem, ovate to elliptic – lanceolate
Petiole	2–5 cm long	1–2 cm long
Size of the flower	3–3.5 cm across	1.5–2.0 cm across
Colour of the flower	White	Deep pink to rose
Dorsal petal	Broadly obcordate, cuneate at base, notch slightly divided, apical projection up to 1 cm long	Linear obcordate, cuneate at base, deeply divided at notch, apical projection up to 0.5 cm
Lateral petals	Obcordate, similar to dorsal petal, apical projection absent	linear elliptic, apical notch with 0.2 cm projection
Lower petals	Obovate, cuneate at base, not divided, without apical projection	Linear -oblong, cordate at base, 2-lobed, lobes unequal with apical projection.
Spur	to 5 cm long, glabrous, tip curved backward, greenish white.	to 3 cm long, hairy, tip curved forward, deeply pink
Pedicel	up to 6 cm long, glabrous	up to 3 cm long, ciliate
Capsule	ovate, finely tomentose	Oblique lanceolate, glabrous
Seeds	up to 20 per capsuel, pale brown, With dome-like hairs.	up to 10 per capsule, brown, With minutely puberulate

Type: India, Tamil Nadu, Namakkal District, Kolli hills, on the way to Kulivalavu, 11°16.74'N; 78°19.88'E, 885 m., 1 Sep 2012. Karuppusamy S. and Ravichandran V. 1037 (Holotype: MH; Isotype: Sri Ganesan Herbarium, Department of Botany, The Madura College, Madurai).

Annual, suffruticose, erect herb with cylindrical branches, 50–90 cm tall; stem pale greenish, glabrous, pink to purplish at nodes, branching trichotomous, internodes elongate, 3–3.5 cm long; leaves crowded at tip of the stem, petiole to 2–5 cm long, canaliculated, glabrous, pair of stipitate glands at middle, few other glands also base of petiole and near the junction of lamina; leaf blade linear-elliptic, 4–11 × 2–3.5 cm, base cuneate, glabrous, sparsely tomentose above, glaucous below, margins dentate-crenulate, crenate lobes with acute tip, apex acute to obtuse, main nerves whitish, glabrous on both surface, lateral nerves 6–8 pairs, slightly canaliculated above; flowers 1–3 at each node, axillary, simple, 3–3.5 cm across, pure white, mouth slightly pinkish, pedicellate, pedicel to 6 cm long, glabrous, erect at the time of anthesis, fruiting pedicel pendent; lateral sepals minute, c. 1 mm long, greenish, ovate-lanceolate, nerves inconspicuous, acute; lower sepal in to conical above with long slender spur below, to 5 cm long, glabrous, slightly greenish, incurved above, curved backward at tip; petals: dorsal petal broadly obcordate, 1.5–2 × 1–1.5 cm, dorsally keeled, glabrous, ventrally concave, apical notch slightly divided with stout hook like projection, to 1 cm long; lateral petals obcordate, cuneate at base, 1.5–2 × 1.5 cm, pure white, two lobed, lobe equal, slightly divided, without any projection at notch; lower petals obovate, 1.5–1 × 0.7–1 cm, cuneate at base, midvein inconspicuous, not lobed or divided, apically rounded, rarely emarginate; stamens 5, united at the top, filaments pink, membranous with covered the ovary, anthers yellow, pollen white Ovary elliptic-ovoid, cylindrical, 0.4–0.6 mm long, tip obtuse, glabrous, slightly curved; capsule obliquely ovate, 2–2.3 cm long, minutely stipitate,

dark greenish, finely tomentose; seeds up to 20 per capsule, ovoid, $0.2-0.5 \times 0.1-0.2$ cm, pale brownish with dome-like appendages throughout on testa, slightly caruncled.

Fl. & Fr.: August – December.

Phenology: Flowering and fruiting in August to December.

Distribution: So far known only from Kolli Hills of Namakkal District and Shevaroy Hills of Salem District in Eastern Ghats of Tamil Nadu, South India.

Etymology: The new species is named in honour of Dr. M. Vaiyapuri, a renowned botany teacher in P.Velur, Namakkal district and environmentalist in recognition of his valuable contributions to plant taxonomy.

Conservation status: *I. vaiyapurii* is known only from a small patch of mixed deciduous forests, 750-890 m of Kolli hills, a part of southern Eastern Ghats, Namakkal district, Tamil Nadu. The habitat is crossed with motor road and heavy human disturbance with tree felling, road clearing, and other activities. Hence the conservation status of this plant is for the time being suggested as Critically endangered (CR B1ab(ii,iii)+B2ab(i,ii)) according to IUCN (2012).

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Ethical approval

The ethical guidelines for plants & plant materials are followed in the study for species collection & identification.

Conflicts of interest:

The authors declare no conflict of interest.

Data and materials availability

All data associated with this study are present in the paper.

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